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UNITED STATES DEPARTMENT OF COMMERCE
National Telecommunications and
Information Administration

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Federal Communications Commission
Office of Secretary

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, DC 20554

Re: Allocation and Service Rules for the 71-76 GHz, 81-86 GHz and **92-95 GHz Bands**, Loea
Communications Corporation Petition for Rulemaking, WT Docket No. 02-146, RM-10288

Dear Ms. Dortch:

Enclosed please an original and six (6) copies of the Reply Comments of the National
Telecommunications and Information Administration in the above-referenced proceeding. A diskette
with a WordPerfect file of the comments is also enclosed.

Please direct any questions you may have regarding this letter to the undersigned. Thank you for your
cooperation.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Kathy D. Smith".

Kathy D. Smith
Chief Counsel

Enclosures

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

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*Federal Communications Commission
Office of Secretary*

In the Matter of)	
)	
Allocations and Service Rules for the 71-76 GHz, 81-86 GHz, and 92-95 GHz Bands)	WT Docket No. 02-146
)	
Loea Communications Corporation Petition for Rulemaking)	RM-10288
)	

**Reply Comments of the
National Telecommunications and Information Administration**

The National Telecommunications and Information Administration (NTIA) is the Executive Branch agency principally responsible for developing and articulating domestic and international telecommunications policy. NTIA acts as the principal advisor to the President on telecommunications policies pertaining to the Nation's economic and technological advancement and to the regulation of the telecommunications industry. NTIA is also responsible for managing the Federal Government's use of the radio spectrum. Federal agencies are extremely dependent on spectrum access to support a wide variety of critical services, from weather forecasting to national defense, to benefit the American people.

Historically, frequency bands above 71 GHz have been considered unattractive for commercial operations because of a lack of both low-cost radio-frequency components and service rules for commercial users. Technology, developed in a large part by the Federal Government, now enables the commercial use of these bands. **NTIA** supports the use of this new technology to foster commercial development, both for the economic growth potential, and because establishment of broadband services in the bands above **71** GHz may reduce the pressure

on spectrum demand in the frequency bands below 3 GHz. With the initiation of this rulemaking, we are called upon to strike an appropriate balance between the growth of new commercial services and the expanding operation of important federal systems. Further, we now have the regulatory challenge of equitably integrating future commercial uses with existing federal systems in a frequency band with shared jurisdiction. NTIA, in consultation with the Interdepartment Radio Advisory Committee (IRAC), hereby furnishes the following comments to the Notice of Proposed Rulemaking (NPRM) regarding the 71-76 GHz, 81-86 GHz, and 92-95 GHz bands (FCC 02-180).¹

General Comments

NTIA believes that the common goal of both the NTIA and the Federal Communications Commission (Commission) is to promote efficiency and equity in all spectrum sharing, and that equitable sharing of shared-jurisdiction frequency bands leads to the most efficient use of the spectrum resource. While the Commission reserves the right *to* partition the bands under its rules to accommodate commercial use, federal use in these bands is not partitioned, and will not necessarily be limited to a few federal sites. With the technology currently available to users, a minimum of interference should be realized, resulting in a large degree of full-band sharing. Therefore, NTIA supports full sharing, and sees as unnecessary any *a priori* restrictions of federal operational use of these bands.

¹ Allocations and Service Rules for the 71-76 GHz, 81-86 GHz, and 92-95 GHz Bands and Loea Communications Corporation Petition To Rulemaking, *Notice of Proposed Rulemaking* (NPRM), FCC 02-180, 67 Fed. Reg. 59036 (2002).

NTIA notes that new allocations are proposed for these bands. The allocations proposed in the NPRM are a part of a larger international allocation action agreed to by the United States delegation at the 2000 World Radiocommunication Conference (WRC-2000).² The final United States proposals for WRC-2000 were reached after numerous discussions among all interested parties, and were carefully balanced so that the amount of usable spectrum allocated for each radio service will remain substantially the same, as noted in Paragraph 13 of the NPRM. Any significant delay in implementing the remaining national allocations (those not covered in the NPRM) produces an imbalance in the service allocations, and possible delay in the deployment of new systems. Therefore, NTIA requests that the Commission rapidly complete the national implementation of the WRC-2000 allocations.

Frequency Coordination and Band Managers

NTIA welcomes commercial use of the 71-76 GHz, 81-86 GHz, and the 92-95 GHz bands, and believes that use of Part 101 rules to govern commercial use of these bands would be appropriate, with satisfactory coordination. Coordination among the various users of these bands will be a critical factor in successful sharing. In the context of full sharing, band managers may have merit if they act as band coordinators. However, the Commission's consideration of band managers does require focusing on the issue of sharing between federal and commercial use in co-equally shared frequency bands.'

² See *Final Acts of the World Radiocommunication Conference*, International Telecommunication Union, Geneva, Switzerland.

³ See NPRM at ¶¶ 79-81.

Historically, commercial users planning to use a shared band would submit a frequency assignment request to the Commission, which would then bring the request into the NTIA's Frequency Assignment Subcommittee (FAS) of the IRAC for approval. NTIA recognizes the inherent problems with this procedure, since commercial users are not privy to the federal data base of frequency assignments, and must blindly select a proposed frequency. If this system were to continue, the large numbers of commercial assignments likely in this band could overwhelm the system and lead to significant burdens on the Commission and unacceptable delays in obtaining approval of assignments. The situation is further complicated by military use of the band, where some applications and frequency assignments are classified for national security reasons.

The Commission has a number of options to consider for coordination in the bands. First, the Commission could maintain the *status quo*, in which the Commission brings new assignments into the FAS for coordination. This procedure has the disadvantages mentioned above.

If the Commission adopts the band manager concept, it is essential that the interaction between these band managers and NTIA be carefully evaluated and structured with a focus on preservation of federal access to the bands. In no event should the band managers be able to preclude access to the bands by the Federal Government. The band manager(s) should still need to interface with NTIA or the FAS to coordinate non-federal assignments. This procedure would limit the Commission's involvement with the coordination process, but could lead to lengthy coordination times and impose a burden on the FAS.

Alternatively, the band manager(s) could coordinate both federal and non-federal commercial assignments, as long as they were authorized to handle classified federal frequency assignment information. However, given the strict controls on handling classified material, this could significantly limit the number of authorized band managers (or coordinators). Another alternative would be for the band manager(s) to maintain a database of all commercial assignments within its authority, plus sufficient data on federal assignments to effect coordination with commercial applicants. In this event, NTIA and the band manager(s) would need to use a common set of criteria for coordination. NTIA would also need to have real-time access to these databases for use by the FAS. NTIA would then enter summarized federal assignments approved by the FAS into the appropriate band manager's database.

Before any of these alternatives could be implemented, the Commission and NTIA would have to have a clear understanding of how band managers could serve in the role of coordinators since band managers have not previously been used for coordination in shared bands. This concept, however, could break new ground in spectrum management.

71-76 GHz Band

NTIA supports the proposed revisions to the National Table of Frequency Allocations with regard to the 71-76 GHz band.⁴ The Federal Government plans to use this band for fixed, mobile, and space research applications, and also requires access to the band for future satellite networks. NTIA has worked within the International Telecommunication Union Radiocommunication Sector (ITU-R) process to obtain space service allocations in both the 71-

⁴ *Id.* at ¶ 25.

76 GHz and 81-86 GHz bands, including satellite allocations of five continuous gigahertz in the space-to-Earth and Earth-to-space directions. Some of the satellite systems will require nationwide access, while others may be limited to a minimum number of feederlink-type earth stations. Presently, the Federal Government is registering Department of Defense (DOD) fixed-satellite service (FSS) systems in the bands 71-76 GHz (space-to-Earth) and 81-86 GHz (Earth-to-space) with the ITU. The advance publication information on these systems was sent to the ITU in March 1938 and November 1999, and these systems are currently being coordinated with other administrations. Accordingly, the **rules** resulting from this rulemaking should not compromise the actions already being taken by the Federal Government to use these bands consistent with the current National Table of Frequency Allocations. In this regard, **NTIA** agrees with the proposed footnote, USwww, which would protect Federal Government fixed-satellite service operations.⁵ NTIA also agrees with the proposed footnote USyyy regarding the amateur and amateur-satellite services in this band.⁶ NTIA generally supports licensed ~~Part~~ 101 commercial usage and sharing of this band on a coordinated site-by-site basis.

Although Government FSS systems have been advance published, the terrestrial services will be established in the bands long before the satellite systems become operational. **NTIA** understands that footnote USwww places a burden on the commercial user since the specific locations of federal earth stations that will operate in the 70 and 80 GHz bands are unknown at this time. NTIA will develop a list of potential federal earth station locations for the purpose of future coordination with terrestrial stations.

⁵ *Id.* at ¶ 21.

⁶ *Id.* at ¶ 23.

NTIA is also concerned about potential interference from space stations to the terrestrial fixed systems. Although power flux-density (pfd) limits may be the solution to this problem, NTIA believes it is premature to impose pfd limits until the general technical parameters of the fixed systems are determined and studies can be completed to determine appropriate pfd values.

81-86 GHz Band

NTIA supports the proposed revisions to the National Table of Frequency Allocations with regard to the 81-86 GHz band.⁷ As with the 71-76 GHz band, the Federal Government plans to use the 81-86GHz band for fixed, mobile, space research and radio astronomy services, and also requires access to the band for future satellite networks. As noted above, NTIA has worked within the ITU-R process to obtain space service allocations in both the 71-76 GHz and 81-86 GHz bands, including satellite allocations of five continuous gigahertz in the space-to-Earth and Earth-to-space directions. Some of the satellite systems will require nationwide access, while others may be limited to a minimum number of feederlink-type earth stations. Presently, the Federal Government is registering DOD FSS systems in the bands 71-76 GHz (space-to-Earth) and 81-86 GHz (Earth-to-space) with the ITU. The advance publication information on these systems was sent to the ITU in March 1998 and November 1999, and these systems are currently being coordinated with other administrations. Accordingly, the final rules should not compromise the actions already taken by the Federal Government to use these bands consistent with the current National Table of Frequency Allocations. In this regard, NTIA

⁷ *Id.* at ¶ 34

agrees with proposed footnote USwww that would protect Federal Government fixed-satellite service operations, and modified footnote US342 that would protect radio astronomy.⁸

92-95 GHz Band

The 92-95 GHz band is different from the other two bands addressed in this NPRM in that this band has an additional allocation for the radiolocation service on a primary basis. It is to a large degree the research and development of radar technology that has made this band viable for radiocommunication operations. Federal agencies currently have several developmental and operational radar applications in this band, and many more are in the planning stages. Presently, these federal radar systems are used for weapons control, target tracking, and other classified uses. As noted in the NPRM, the 92-95 GHz band is located in a relative minimum of the oxygen absorption curve, making it very attractive for applications requiring small aperture antennas and narrow beamwidths.⁹ This band is currently characterized by current usage as a radar band. While NTIA welcomes shared use of the band by commercial entities, the essential radiolocation service usage of the band must not be restricted. Accordingly, NTIA cannot support the proposed footnote USxxx.¹⁰

NTIA supports the proposed revisions to the National Table of Frequency Allocations summarized in paragraph 42 of the NPRM and the modification of footnote US342.¹¹ The revisions are consistent with the current operations and plans of Federal Government users. For example, the Army notes that it currently has 18 systems designed to operate in the 92-95 GHz

⁸ *Id.* at ¶ 21, 31.

⁹ *Id.* at ¶ 8.

¹⁰ *Id.* at ¶ 53.

¹¹ *Id.* at ¶¶ 41, 42.

band, ranging from fixed and mobile communications to radiolocation, and it plans to develop additional systems. The Navy notes that it has 7 systems operating in the band and the Air Force stated that has about 13 systems, including space-based radar. The Department of Energy and the National Aeronautics and Space Administration (NASA) also have spectrum requirements in the 92-95 GHz range. The Federal Aviation Administration has a synthetic vision program designed to operate around 94 GHz.

NTIA's specific comments on the various questions and proposals regarding the 92-95 GHz band are as follows:

Space Research Service. Both NASA and the Air Force have plans to operate cloud profiling radars in the space research service in the 94-94.1 GHz band. The Air Force will soon operate cloud profiling space-based radars, with a planned launch date for the Cloudsat satellite of March 2003. NASA currently has terrestrial frequency assignments in the Government Master File (GMF) for prototype cloud-profiling radar operation. Accordingly, NTIA supports the allocation of the 94-94.1 GHz band to the space research service.

Radiolocation Service. The radiolocation service is a co-primary service with the fixed and mobile services in the 92-95 GHz band. The NPRM does not discuss sharing between operations in the radiolocation service and operations in the fixed and mobile services, other than a brief mention of radar.¹² The Federal Government has been intensely interested in developing radars in this band, and there are currently several systems operational and in the developmental process. These radars are primarily for use by the military services, and include weapon

¹² See *id.* at ¶ 54.

guidance, obstacle avoidance, and friendly force interrogation applications. There are also military airborne applications for radar in this band.

NTIA is concerned about the interference potential of air-to-ground radars in the 92-95 GHz band. For this reason, NTIA, in coordination with the DOD and other interested parties, is investigating the establishment of power flux-density values for airborne radars that will allow sharing with fixed service systems in the band. NTIA is completing an initial study on potential interference from airborne radar to fixed point-to-point systems, and will forward this study to the Commission separately. Commercial entities interested in using this band should be aware of the potential for interference caused by radars, especially airborne radars.

Radio Astronomy Service. The National Science Foundation (NSF) states that under the proposed rules drafted by the Commission (indoor use only and no airborne applications), Part 15 devices pose no sharing problems for United States radio astronomy facilities under any of the possible 92-95 GHz band plans listed in the NPRM. However, in order to avoid interference to radio astronomy observatories, licensed users in all portions of this band should coordinate their operations with United States radio astronomy facilities. Coordination radii of the order of 150 km radius around the 8 single dish observatories and 25 km around the 10 Very Long Baseline Array (VLBA) stations, as shown in proposed footnote USzzz, appear to be sufficient to ensure protection of radio astronomy facilities. We therefore support proposed footnote USzzz.¹³

The Commission poses a series of questions about radio astronomy allocations in the NPRM.¹⁴ These allocations, adopted internationally, were a part of the United States' proposals

¹³ *Id.* at ¶ 45, n. 57, Appendix A

¹⁴ *Id.* at ¶¶ 44, 45.

for WRC-2000. While it may be appropriate to inquire if radio astronomy allocations could hinder commercial development in the context of the NPRM, this question was essentially answered through the development of the United States proposals to the WRC-2000. The redistribution of radio services allocated to these bands was achieved in the context of the extensive reallocation of the entire 71-275 GHz spectral region adopted by WRC-2000 - - a process that was driven by the United States. It was the U.S. proposal that was adopted at the Conference with very minor modifications. This proposal was a compromise that balanced all competing interests across the entire spectral region and preserved the amount of usable spectrum available to all services prior to the reallocation. For example, the radio astronomy and Earth exploration-satellite services relinquished access to portions of exclusive passive spectrum in return for limited access to other regions of the spectrum through coordination with other services. Thus, prompt implementation *in toto* of the Final Acts of WRC-2000 regarding the allocation changes in the 71-275 GHz band is not only appropriate, but necessary so as not to upset the careful allocation balance among all services that was achieved in the U.S. proposal.

The Commission specifically requests comments on whether the 81-86, 92-94 and 94.1-95 GHz bands should be allocated to the radio astronomy service (RAS) on a primary basis." Further, the Commission asks if all of this spectrum is needed for radio astronomy purposes, and if not, what portions are essential and what portions might be allocated to radio astronomy on a secondary basis.¹⁵ NSF has brought to our attention that these questions have been answered already in the course of discussions that led up to the U.S. proposal to the WRC on reallocation

¹⁵ *Id.* at ¶ 44

¹⁶ *Id.*

of the 71-275 GHz spectral range, and that access by radio astronomers to all of these bands is essential. In fact, as noted above, the reallocation of the 71-275 GHz spectral range was predicated on radio astronomers giving up some spectrum in return for access to other spectral regions. The NPRM proposes to delete footnote US270 71-74 GHz band, in agreement with the action taken by the WRC.¹⁷ However, this is one of the instances when limited protection for some spectral lines in one hand was traded by radio astronomers for access to other lines. Therefore, deletion of footnote US270 from the 71-74 GHz band, without allocating the 81-86 GHz band to radio astronomy, would upset the balance achieved by the WRC.

NSF also notes that the bands in question are covered or, in some instances, will be covered, in part or in full, by receivers operated by the observatories listed in the proposed footnote USzzz. For example, the highest frequency receiver available at the VLBA covers the 81-86 GHz band fully, while the frequency coverage available at the Massachusetts Institute of Technology's Haystack Observatory includes the 82-86, 92-94 and 94.1-95 GHz bands. Various science advisory committees to NSF and to other institutions have provided ample justification for astronomical exploitation of these spectral regions. The justification includes the facts that extremely high sensitivity can be achieved by modern radio telescopes by using large bandwidths (modern radio telescope receivers may be designed with up to 8 GHz Intermediate Frequency bandwidth for continuum observations), and that high-sensitivity new generation receivers enable astronomers to observe the highly red-shifted lines and to conduct research on the early history and evolution of the universe. The frequency coverage at various observatories and

¹⁷ *Id.* at ¶ 20.

scientific justification for observing at these particular frequencies, as well as the results obtained, are available at the extensive world-wide-web sites maintained by various observatories listed under the proposed footnote USzzz and in the open scientific literature. NSF also correctly indicated to us that secondary allocations are not particularly useful to radio astronomy as they provide simply an indication of the interest of radio astronomers in such a band, but no guarantee of being able to observe them.

The Commission also requests comments on the proposed requirement for a web site maintained by radio astronomy observatories to facilitate coordination.¹⁸ Millimeter-wave (mm) observatories are, as a rule, located at high sites, above most of the moisture in the atmosphere. Locations such as the one described in the NPRM for Owens Valley are exceptional. NSF states that the Owens Valley and BIMA observatories, listed in the proposed footnote USzzz, have recently decided to merge under the name Combined Array for Research in Millimeter-wave Astronomy (CARMA). CARMA will be located at a new, high-altitude site in eastern California, expected to be operational in 2004. While there are some exceptions, a typical setting for a mm-wave radio observatory is that of a mountaintop or high plateau, where interference may be received from 360° of the surrounding in the antenna sidelobes. However, NTIA appreciates the commercial potential in the band and supports the Commission's proposed coordination procedure, designed to avoid unnecessary coordination, such as when pencil beam antennas are pointed away from the neighboring observatory." If successful, such a coordination procedure could minimize the burden on all those involved. NSF is in the process of working on

¹⁸ *Id.* at ¶ 45

¹⁹ *Id.*

a coordination procedure with the various U.S. observatories. Once agreement is reached within the radio astronomy community, NSF has indicated a desire to work out and formalize such a coordination procedure with the Commission, with assistance from NTIA.

The Commission also seeks comments on the possibility of limiting geographically the scope of radio astronomy service allocations, along the lines of the restrictions imposed in the 10.68-10.7GHz band." NTIA supports this suggestion, as long as it does not include areas surrounding existing observatories for as long as they continue to operate. To maximize scientific effectiveness, mm-observatories seek sites that are high, dry and far from man-made interference. It is therefore highly unlikely that new observatories would desire to locate near the hundred most populous areas in the United States. However, any such geographical limitations should exclude existing, operating observatories. In addition, NSF has requested that new footnote USzzz be worded as follows: "In the bands 81-86GHz, 92-94 GHz, and 94.1-95 GHz, and within the coordination distances listed in the Table, assignments to allocated services shall be coordinated with the following radio astronomy observatories:"

Adjacent Bands. The Commission also discusses protection for passive services in the 86-92 GHz band, and other services, including radio astronomy, in the 95-100 GHz band.²¹ Because of the current and planned passive systems in the 86-92 GHz band, NTIA agrees that adequate protection from systems operating in the 92-95 GHz band ~~is~~ necessary. NTIA is not aware of any special protection requirements for the upper adjacent 95-100 GHz band.

²⁰ *Id.* at ¶ 46.

²¹ *Id.* at ¶ 49.

Band Plans. The Commission proposes three band plans for the 92-95 GHz band - - two of which include both licensed and unlicensed use; the third proposes licensed use **only**.²² Federal use of the band will be for both military and federal civil agency applications, but probably the majority of use will be accomplished by the military services. To a large degree, military usage will be geographically located on federal facilities, but military requirements for Homeland Security operations may lead to operations elsewhere within the United States. While the Federal Government desires to share the band to the maximum degree possible, Federal systems cannot operate on a secondary basis or be restricted to operate only on Federal property. Current and planned federal systems operating in the 92-95 GHz have bandwidths that exceed the proposed federal primary segments. There **will** also be federal airborne radiolocation operations. The extent of future federal operations in this band cannot be defined precisely at this time, and will evolve with time and national security requirements. Thus, extensive coordination must be required if sharing is to be successful.

Toward this end, NTIA suggests that a limited number of trusted frequency coordinators be established to coordinate the usage between federal and licensed commercial users. These coordinators may also be "band managers" in the context of the proposals in the NPRM as mentioned earlier. In this regard, it would seem necessary to license commercial usage in the band on a site-by-site basis to facilitate coordination. Part 15 devices may operate on a non-interference basis. However, Part 15 devices operating in the 94.0-94.1 GHz band should be limited to indoor use to protect the space research allocations in the band. Any partitioning

²² See *id.* at ¶¶ 50-56.

between non-Federal Government licensed and unlicensed usage would be at the discretion of the Commission.

Geographic Area Licensing

The Commission also discusses licensing by geographic areas in these bands.²³ Two commercial entities have discussed their plans with NTIA. Both firms advocate individual site licensing, and had recommendations for handling the coordination process. In order to achieve successful coordination between federal and commercial users, a complete database of transmitters and receivers must be available to the coordinator. The existence of this database will ensure that the method of licensing is transparent to all users.

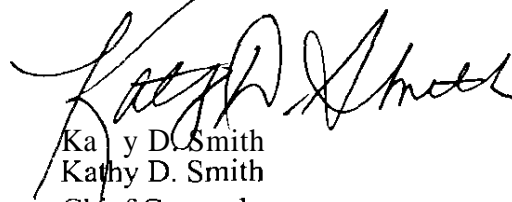
NTIA also wants to make clear that the Commission's comments regarding a licensee's exclusive use of spectrum within its license area under a geographic area licensing scheme does not preclude Government use of that spectrum, but only use by other non-Federal users.²⁴

²³ See *id.* at ¶¶ 65-73

²⁴ See *id.* at ¶ 88.

NTIA looks forward to working with the Commission to accommodate new government and commercial applications in these bands.

Respectfully submitted,



Kathy D. Smith
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February 3, 2003

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